



mornington island case study

Mornington Island Sewage Outfall

June 2008 – September 2008

Mornington Island, in the Gulf of Carpentaria is surrounded by a variety of sensitive marine habitats, including seagrass beds and coral communities. Upgrading the existing sewage treatment plant at the main township, Gunana, was identified as a priority under the Indigenous Environmental Health Infrastructure Program, managed by Cardno. In order to facilitate this upgrade, managing sub-contractors Connell Wagner chose frc environmental to assess the likely impacts of the proposed ocean outfall on the aquatic environment, guiding its final design and construction.

Project requirements overview

frc environmental was requested to consider the likely environmental impact of the proposed outfall alignment, and to recommend changes where a better environmental outcome could be envisaged. We were also asked to consider the likely impacts of effluent discharge on the aquatic ecology of the surrounding water.

Sewage effluent typically contributes nutrients and suspended solids to the receiving water. Seagrass, algal beds and coral communities are particularly susceptible to increases in both nutrients and suspended solids, and changes to these communities can result in impacts to marine fauna such as fishes, crabs, turtle and dugongs.

The demonstration of an acceptable environmental impact was critical to gaining licensing approval. Further, indigenous stakeholders required assurance that traditional fisheries would be protected.



Collecting benthic samples - we use a variety of rigorous sampling techniques to ensure we get complete data, the first time.

Project Performance

- Survey protocols based on extensive experience in the region – minimising required field time
- Mobilisation of field team to coincide with our client's presence on site
- Balanced use of field and laboratory approaches to illustrate existing pressures, and demonstrate the need for upgrading
- Effective integration of ecological and engineering understanding to achieve acceptable impacts without significant constraints to design or budget
- An EMP reflecting best practice and satisfying all stakeholders
- Ready acceptance of the refined design by DERM

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Our tailored approach and methodology

Extensive experience across tropical Australia, combined with equally extensive experience working to avoid, minimise and mitigate the impacts of treated sewage effluent discharge on coastal ecosystems, gave **frc environmental** a significant 'head start'. Our understanding of ANZECC and regional water quality guidelines, and the sensitivities of marine ecological communities also enabled us to have clear performance goals in mind.

In the field, our ecologists surveyed key intertidal and shallow sub-tidal habitat along and adjacent to the proposed alignment. An acceptable alternate alignment was negotiated to significantly reduce disturbance to seagrass meadows. Fringing reef corals were surveyed and their sensitivity to nutrient enrichment assessed. The impacts of existing effluent treatment and discharge were determined using *in situ* assessment of indicators such as seagrass epiphyte load and community structure, and laboratory-based isotope analysis of seagrass, mangrove and algal tissue.

The conservation status of potentially impacted communities and species was assessed, and the environmental sensitivity of identified 'rare and threatened' species carefully considered. Working with Connell Wagner's hydraulic engineers, **frc environmental's** reef ecologists were able to refine the alignment of the discharge pipe and guide the placement of the discharge diffuser to achieve an acceptable mixing zone and negligible risk to coral and seagrass health.

Our ecologists were able to guide Connell Wagner's team in the development of an Environmental Management Plan that minimised construction impacts through avoiding the turtle nesting season, isolating works using silt curtains and bunds, and the re-profiling of excavated areas to minimise erosion.

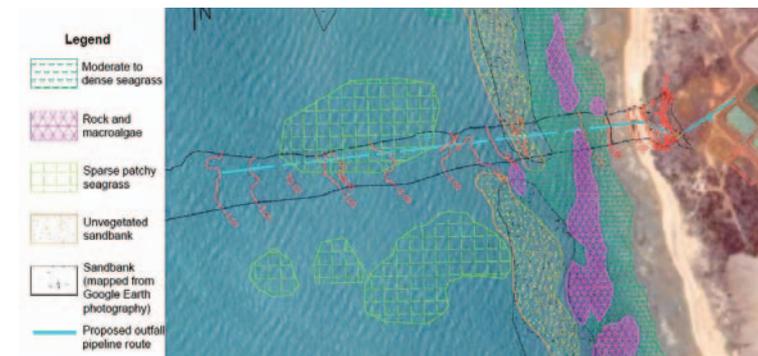
As part of this project we also assessed the risk to public health and the marine environment of cyanobacteria (blue-green algae) growing in the treatment ponds, and provided management guidelines to minimise risks and reduce the problem.



Preparing an underwater camera to take photos for Coral Point Count analysis, used to determine community composition and cover of benthic communities.



Ecologist preparing the corer to collect benthic samples – our extensive experience has provided us with highly efficient field techniques.



A map showing the distribution of seagrass, rocky reefs and sand banks in the vicinity of the proposed outfall pipeline.

industry experience

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